

REMARKS

In the Office Action, the Examiner issued a final rejection of Claims 1-30, which are all of the then pending claims, under 35 U.S.C. §103 as being unpatentable over the prior art, primarily U.S. Patent Application publication no. 2002/0116371 (Dodds, et al.) and U.S. Patent 6,604,100 (Fernandez, et al.). More specifically, Claims 1-4, 8, 10, 13, 14, 17, 19, 20 and 27-30 were rejected as being unpatentable over Dodds, et al. in view of Fernandez, et al; and Claims 5-9, 11, 12, 15, 16, 18, 22, 23, 25 and 26 were rejected over Dodd, et al. in view of Fernandez, et al. and further in view of U.S. Patent publication no. 2003/0120665 (Fox).

Claim 21 was rejected as being unpatentable over Dodd, et al. in view of Fernandez, et al. and further in view of U.S. Patent publication no. 2003/0212660 Kerwin), and Claim 24 was rejected as being unpatentable over Dodd, et al. in view of Fernandez, et al, Fox and Kerwin. Claims 29 and 30 were further rejected under 35 U.S.C. 101 as directed to non-statutory subject matter.

Applicants herein ask that Independent Claims 1, 13, 27, 28, 29 and 30 be amended to better define the subject matters of these claims. Also, the rejection of Claims 29 and 30 under 35 U.S.C. 101 is respectfully traversed.

With respect to Claims 29 and 30, the Examiner argued in the Office Action that the components of the systems of claims 29 and 30 are software per se. Applicants respectfully disagree. Both of these claims describe specific structural elements.

To elaborate, Claim 29 is directed to a system for creating an XML representation of data stored in a relational database, and Claim 30 is directed to a system for updating information stored in a relational database based on data extracted from an XML object. Figure 7 shows an example of the system described in Claim 29 and Figure 9 shows an example of the system

described in Claim 30. These figures show physical hardware used as the systems of Claims 29 and 30. In particular, Figure 7 shows an XRT Engine 701 that is used to retrieve data from a relational database and to output that data in XML. Similarly, Figure 9 illustrates XRT Engine 901 that is used to take XML data and to store that data in a relational database. These figures 7 and 9 show processing unit that, when programmed as described in the specification, are the systems of Claims 29 and 30.

For instance, both of these claims expressly include a mapper and a retriever. Claim 29 also includes a formatter, and Claim 30 also describes a performer. A mapper, for example, is not software per se, but instead, is, in the preferred embodiment of the invention, a processor or processing unit, such as the XRT Engine of Figure 7 or 9, that is provided with the appropriate hardware or software, or combination of hardware and software, necessary to perform the claimed function of the mapper – creating a mapping description using a markup language from a user specified set of conditions and output format. Consequently, Claims 29 and 30 set forth physical structure and clearly define physical system, which are described in the specification and the drawings. The claims are, hence, a machine, within the meaning of 35 U.S.C. §101, and thus are statutory subject matter under 35 U.S.C. §101.

For the foregoing reasons, the Examiner is asked to reconsider and to withdraw the rejection of Claims 29 and 30 under 35 U.S.C. §101.

In addition, all of Claims 1-30 patentably distinguish over the prior art because the prior art does not disclose or suggest storing XRTL script in a cache, and using script from that cache to transform data between an XML document and a relational database, as described in independent Claims 1, 13, 27, 28, 29 and 30.

In order to best understand this difference between the claims and the prior art, and the significance of this difference, it may be helpful to review briefly the present invention and the prior art.

The instant invention, generally, relates to systems for mapping transformations between relational database management systems and XML electronic documents. As discussed in detail in the present application, both XML documents and relational databases are in very common use, and these elements are often used together by the same application. Consequently, methods for efficiently mapping between XML documents and relational databases are becoming increasingly important. While procedures are known that can do this, these prior art procedures are heavily slanted towards the database schema that they support, and the XML that can be created is thus constrained by that schema.

In particular, in the prior art, incorporating specialized code in the applications commonly performs this transformation, with the consequence that any change in either the XML interchange format or the database schema requires a change in the application code itself.

The present invention provides a middleware solution that is independent of the underlying database and that treats both the relational database and the XML document structure in a balanced way. More specifically, this invention does this by specifying a set of conditions that data to be retrieved from the relational database system must satisfy; and specifying an output format that the XML representation must satisfy. Then, a mapping description is created from the set of conditions and the specified output format, and using a markup language. This markup language includes SQL function and XSL function, and the mapping description includes a user defined template identifying a defined procedure for retrieving data from the relational database.

Data is then retrieved from the relational database using the mapping description in association with a standard database access method; and an XML object id formatted representing the retrieved data using the mapping description. In one embodiment of the invention, a plurality of XRTL scripts are stored in a cache as run-time objects. Then, to retrieve data, one of the run-time objects are retrieved from the cache, and that run-time object is used to obtain information from the data base and to transform that information into an XML format.

Storing these scripts in a cache and using the scripts from that cache is useful because, when the same script is used, it provides a significant speed-up, since it avoids parsing the same script more than once.

The prior art does not disclose or suggest storing XRTL script in a cache, and using script from that cache to transform data between an XML document and a relational database.

For Example, Dodds, et al. describes a procedure for assigning attributes to XML document nodes to facilitate their storage in relational databases and the subsequent retrieval and reconstruction of pertinent nodes and fragments in the order in which they occur in the original document. With the disclosed procedure, several properties of each XML document are computed, and these properties are then used to store the document in a relational database.

Fernandez, et al. describes a tool, referred to as the SilkRoute, for viewing and querying relational data in XML. This tool expresses mapping of relational data into SML that conforms to arbitrary document type definitions; however this tool does not have a user defined template that identifies a defined procedure for retrieving data from the relational database. Instead, with the method and system disclosed in Fernandez, et al. the applications express the data they need as an XML query.

Fox, et al. describes an enterprise application system including a run-time transformation server, and a message broker for routing and transforming data in the form of messages between a source application and a target application.

Kerwin discloses a computer system for balancing the load to a plurality of databases in a networked environment.

Independent Claims 1, 13 and 27-30 are each being amended to describe the above-discussed features of the present invention. Specifically, each of these claims, describes the features of storing a plurality of XRTL scripts in a cache as run-time objects and retrieving one of the run time objects from this cache. Claims 1, 27 and 29 describe the further feature of using the retrieved run-time object to obtain data from the relational database and to format the retrieved data. Claims 13, 28 and 30 describe the feature of using the retrieved run-time object to retrieve XML data from the XML document.

As mentioned above, this feature is of utility because, when the same script is used, it provides a significant speed-up, since it avoids parsing the same script more than once.

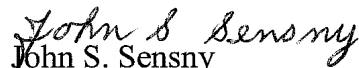
The other references of record have been reviewed, and these other references, whether considered individually or in combination, also do not disclose or suggest this aspect of the instant invention.

As a result of the above-discussed differences between Claims 1, 13 and 27-30 and the prior art, and because of the advantages associated with those differences, Claims 1, 13 and 27-30 patentably distinguish over the prior art and are allowable. Claims 2-12 are dependent from Claim 1 and are allowable therewith; and Claims 14-26 are dependent from, and are allowable with, Claim 13.

The amendments requested herein only elaborate on elements already described in the claims. For example, Claims 1, 27 and 29 currently describes retrieving data from the relational database and formatting that data, and the changes to these claims being made herein describe the role of the XRTL scripts in that retrieval and formatting. Similarly, Claims 13, 28 and 30 presently describe obtaining data from the XML document and using that information to update a relational database, and the changes to these claims requested herein elaborate on the role of the XRTL scripts in these operations. It is thus believed that entry of this Amendment is within the discretion of the Examiner, and such entry is respectfully requested.

For the reasons set forth above, the Examiner is asked to reconsider and to withdraw the rejection of Claims 29 and 30 under 35 U.S.C. §101, and the rejections of Claims 1-30 under 35 U.S.C. §103, and to allow Claims 1-30. If the Examiner believes that a telephone conference with Applicants' Attorneys would be advantageous to the disposition of this case, the Examiner is asked to telephone the undersigned.

Respectfully submitted,


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